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13. ABSTRACT (Maximum 200 words)

A series of surveys off California in 1987 and 1988 allowed the use of nutrients, chlorophyll and phytoplankton species as tools to understand chemical and biological consequences of jets and eddies of the Coastal Transition Zone (CTZ). Results show the spatial distribution of nutrients and phytoplankton in the California Current is determined by mesoscale jets and eddies that recur predictably at similar locations annually. Horizontal distribution of nutrients and phytoplankton was not as predicted; strong offshore jets transport water relatively low in nutrients and phytoplankton. These observations suggest that there are processes that supply nutrients to the surface. A model which suggested the strong jets in the CTZ transported upwelled nutrients to the oceans interior is not supported by our observations. This work showed that strong jets of the CTZ transport water with relatively low levels of nutrients and phytoplankton and that it is shoaling of the nutricline associated with the inshore side of the jets which provides the nutrient supply to the surface layer. This relationship indicates that the jets do not have an inshore origin and that they do not entrain a significant amount of inshore water. These results indicate that the upwelling of the region does not occur in the jets and the jets transport relatively small amounts of nutrients into the ocean interior.

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May 15, 1991

Project Title: Nutrient studies of the structure and consequences of seaward jets in the coastal transition zone.

Principal Investigator:

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A series of repeated surveys off northern California during 1987 and 1988 provided the platform for using nutrients, chlorophyll and phytoplankton species as tools to understand the chemical and biological consequences of the energetic jets and eddies of the Coastal Transition Zone (CTZ). Our results from 1987 and 1988 show that the spatial distribution of nutrients and phytoplankton in the California Current system is determined by mesoscale jets and eddies that recur predictably at similar locations every year. Horizontal distribution of nutrients and phytoplankton, while coherent with the advective regime, was not as predicted; strong offshore jets transport water relatively low in nutrients and phytoplankton. These observations suggest that there are processes, for example upwelling along the southern side of the jets, that supply nutrients to the surface. The early model which suggested the strong jets in the CTZ transported coastally upwelled nutrients to the oceans interior is not supported by our observations. This work advanced to our understanding of the circulation of the California Current and of the consequences the circulation by showing that strong jets of the CTZ transport water with relatively low levels of nutrients and phytoplankton and that it is strong shoaling of the nutricline associated with the inshore side of the jets which provides the nutrient supply to the surface layer. This relationship indicates that the characteristic jets do not have an inshore origin and that they do not entrain a significant amount of inshore water. Additionally these results indicate that the upwelling characteristic of the region does not occur in the jets and the jets transport relatively small amounts of nutrients into the ocean interior.

Publications:

Huyer, A., P.M. Kosro, J. Fleischbein, S. Ramp, T. Stanton, L. Washburn, F.P. Chavez, T. Cowles, S.D. Pierce and R.L. Smith (1990) Currents and water masses of the Coastal Transition Zone off northern California, June to August 1988. *J. Geophysical Res.* (in press)

Chavez, F.P., R.T. Barber, A. Huyer, P.M. Kosro, S. Ramp, T. Stanton and
B. Rojas de Mendiola (1990) Transport of nutrients and
phytoplankton by the jets of the Coastal Transition Zone, 1988.
J. Geophysical Res. (in press)

Kosro, P.M., A. Huyer, S.R. Ramp, R.L. Smith, F.P. Chavez, T.J. Cowles,
M.R. Abbott, P.T. Strub, R.T. Barber, P.Jessen and L.F. Small
(1990) The structure of the transition zone between coastal waters
and the open ocean off northern California, winter and spring
1987. *J. Geophysical Res.* (in press)

Strub, P.T., P.M. Kosro, A. Huyer, K.H. Brink, T.L. Hayward, P.P.
Niiler, C.James, R.K. Dewey, L.J. Walstad, F.P. Chavez, S.R. Ramp,
D.L. Mackas, M.S. Swenson, L. Washburn, J.A. Barth, R.R. Hood,
M.R. Abbott, D.C. Kadko, R.T. Barber, D.N.B. Haidvogel, M.L.
Battman and R.L. Haney (1990) The nature of the cold filaments in
the California Current. *J. Geophysical Res.* (in press)

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